Exhibit D

Exhibit B

Exhibit B - U.S. Patent No. 9,094,888 ("'888 Patent")

Accused Instrumentalities: cellular base stations that support handover between 4G LTE and 5G NR wireless networks, and all versions and variations thereof since the issuance of the asserted patent. Based upon publicly available information and without the benefit of discovery in this case, these base stations include, but are not limited to the following products sold by Nokia, Ericsson, and Samsung:

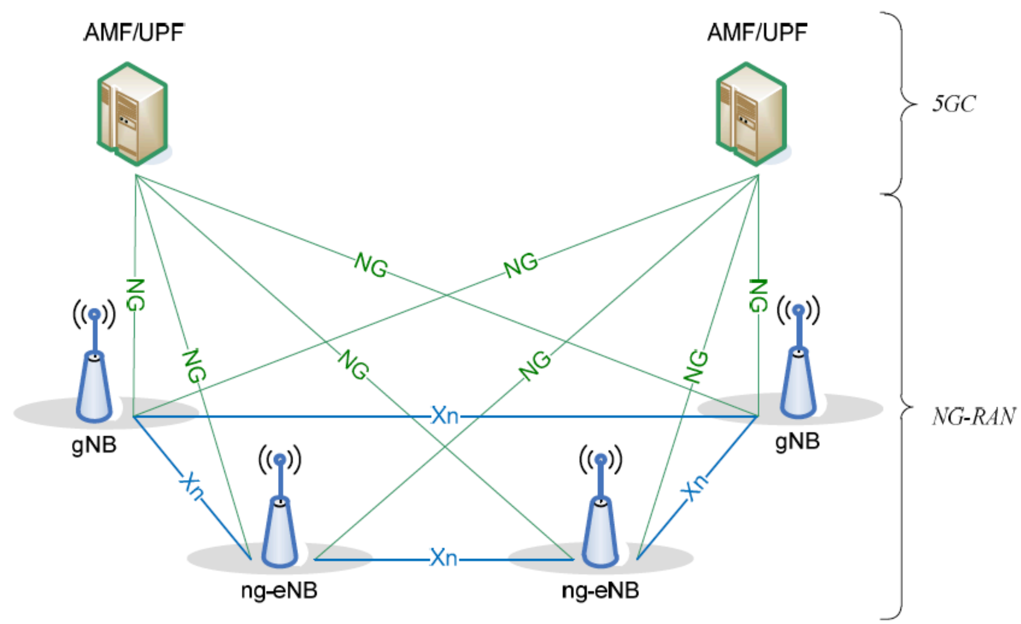
Nokia: AirScale base station, AirScale radio and baseband, AirScale 5G mMIMO base station, ReefShark System on Chip and all products containing the same, AirScale Osprey, AirScale Habrok, AirScale mRRH, AirScale pRRH, AirScale 4.5G Pro RRH, AirScale sHUB, FZHR, AHBOA, FSIH, FHFB, AZHL, AAFIA, 32TRX, and 64TRX.

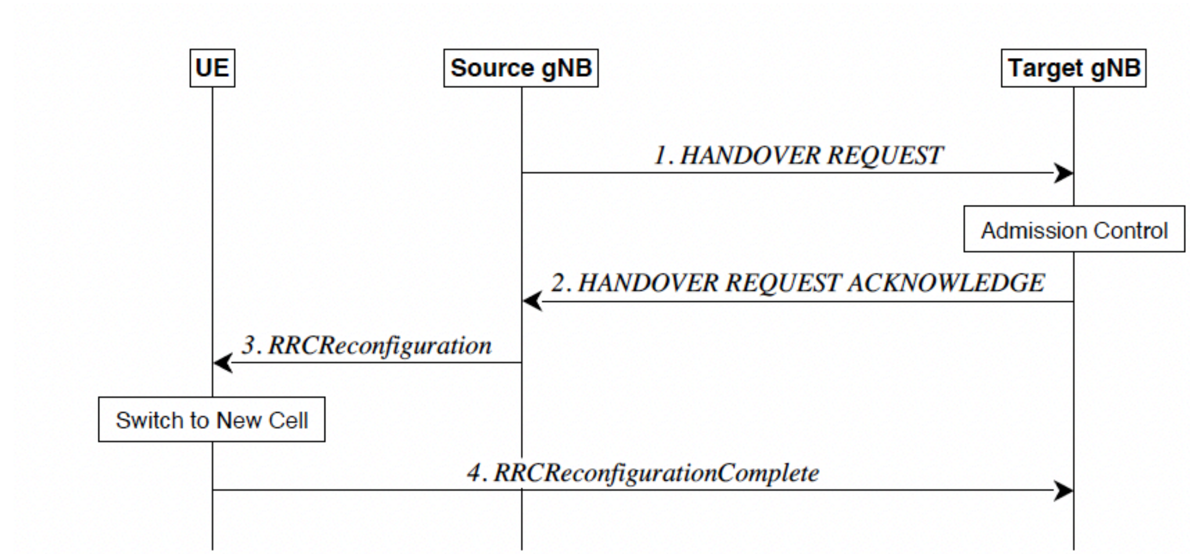
Ericsson: 4G AIR products, 4G Baseband products, 4G Radio products, 4G Antenna products, 5G AIR products, 5G Baseband products, 5G Radio products, 5G Antenna products, AIR 1279, AIR 3218, AIR 3219, AIR 3229, AIR 3239, AIR 3246, AIR 3258, AIR 3268, AIR 3283, AIR 6419, AIR 6428, AIR 6468, AIR 6476, AIR 6488, Interleaved AIR, Baseband 5216, Baseband 6502, Baseband 6648, 5G Radio Dot, Radio 4407, Radio 4408, Radio 4412, Radio 4418, Radio 4485, Radio 4490, Radio 8808, Radio 8863, Antenna 4600, Antenna 4602, Antenna 5500, and Antenna 6600.

Samsung: 4G base stations, 5G base stations, 4T4R CBRS Radio, 32T32R Radio, 64T64R Radio, C-Band Radio, CDU50, One Antenna Radio, Link Hub, and Link HubPro.

Claim 9

Claim 9	Public Documentation
[9pre] A method implemented at a first wireless network for a mobile wireless device handoff between a second wireless network and the first wireless network, the method comprising:	To the extent the preamble is found to be limiting, the Accused Instrumentalities perform a method implemented at a first wireless network for a mobile wireless device handoff between a second wireless network and the first wireless network. For example, the Accused Instrumentalities perform a method for handoff of a mobile wireless device between a second wireless network, comprising for example a 4G LTE eNodeB or ng-eNodeB base station, and a first wireless network, comprising for example a 5G NR gNodeB base station. This method is described, for example, in 3GPP standards documents such as TS 38.300, which describe aspects of the operations of the eNodeB/ng-eNodeB and gNodeB and associated components of the Accused Instrumentalities.

Claim 9	Public Documentation
	4.1 Overall Architecture An NG-RAN node is either: - a gNB, providing NR user plane and control plane protocol terminations towards the UE; or - an ng-eNB, providing E-UTRA user plane and control plane protocol terminations towards the UE. The gNBs and ng-eNBs are interconnected with each other by means of the Xn interface. The gNBs and ng-eNBs are also connected by means of the NG interfaces to the 5GC, more specifically to the AMF (Access and Mobility Management Function) by means of the NG-C interface and to the UPF (User Plane Function) by means of the NG-U interface (see TS 23.501 [3]). NOTE: The architecture and the F1 interface for a functional split are defined in TS 38.401 [4]. The NG-RAN architecture is illustrated in Figure 4.1-1 below.  **Figure 4.1-1: Overall Architecture**

Claim 9	Public Documentation
	(3GPP TS 38.300 v17.2.0, § 4.1) The method includes a handover request and an acknowledgement, as illustrated for example in the following figure:  **Figure 9.2.3.1-1: Inter-gNB handover procedures** (3GPP TS 38.300 v17.2.0, Figure 9.2.3.1-1.) In this figure, the source node is a gNodeB, but a similar request and acknowledgement will be used when the source node is an eNodeB or ng-eNodeB.
[9a] receiving a handoff request from the second wireless network, the handoff request based, at least in part, on a determination by the second wireless network that the wireless device is not currently covered by the first wireless network but is capable of being covered by the first wireless network;	The Accused Instrumentalities receive a handoff request from the second wireless network, the handoff request based, at least in part, on a determination by the second wireless network that the wireless device is not currently covered by the first wireless network but is capable of being covered by the first wireless network. For example, in the Accused Instrumentalities a target NG-RAN node (such as a gNodeB) can receive a handoff request from a source eNodeB, based in part on a determination that the wireless device is capable of being covered by the target gNodeB:

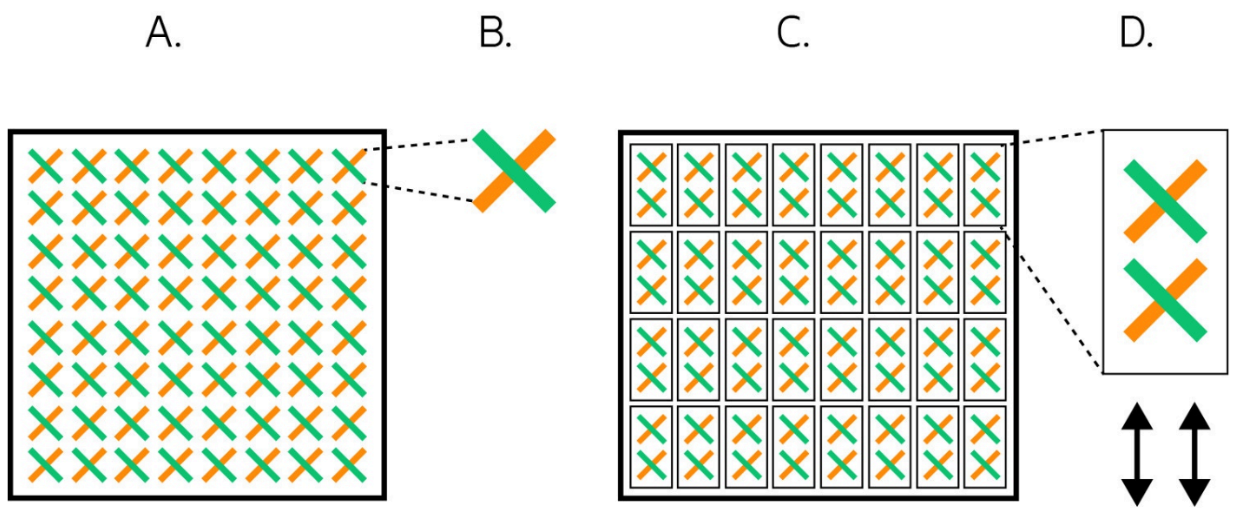
Claim 9	Public Documentation

	9.3.3 NR-E-UTRA mobility: From EPC to 5GC
	
	9.3.3.1 Data Forwarding for the Control Plane
	
	Control plane handling for inter-System data forwarding from EPS to 5GS follows the following key principles:
	
	- Only forwarding of downlink data is supported.
	
	- The target NG-RAN node receives in the Handover Request message the mapping between E-RAB ID(s) and QoS Flow ID(s). It decides whether to accept the data forwarding for E-RAB IDs proposed for forwarding within the Source NG-RAN Node to Target NG-RAN Node Transparent Container. Based on availability of direct data forwarding path the source eNB may request to apply direct data forwarding by indicating direct data forwarding availability to the CN.
	
	- In case of indirect data forwarding:
	
	  - The target NG-RAN node assigns a TEID/TNL address for each PDU session for which at least one QoS flow is involved in the accepted data forwarding.
	
	  - The target NG-RAN node sends the Handover Request Acknowledge message in which it indicates the list of PDU sessions and QoS flows for which it has accepted the data forwarding.
	
	  - A single data forwarding tunnel is established between the UPF and the target NG-RAN node per PDU session for which at least data for a single QoS Flow is subject to data forwarding.
	
	  - The source eNB receives in the Handover Command message the list of E-RAB IDs for which the target NG-RAN node has accepted data forwarding of corresponding PDU sessions and QoS flows.
	
	- In case of direct data forwarding:
	
	  - The source eNB indicates direct path availability to the CN. The source eNB's decision is indicated by the CN to the target NG-RAN node.
	
	  - The target NG-RAN node assigns a TEID/TNL address for each E-RAB it accepted for data forwarding.
	
	  - The source eNB receives in the Handover Command message the list of E-RAB IDs for which the target NG-RAN node has accepted data forwarding.
	
	(3GPP TS 38.300 v17.2.0, § 9.3.3.1)

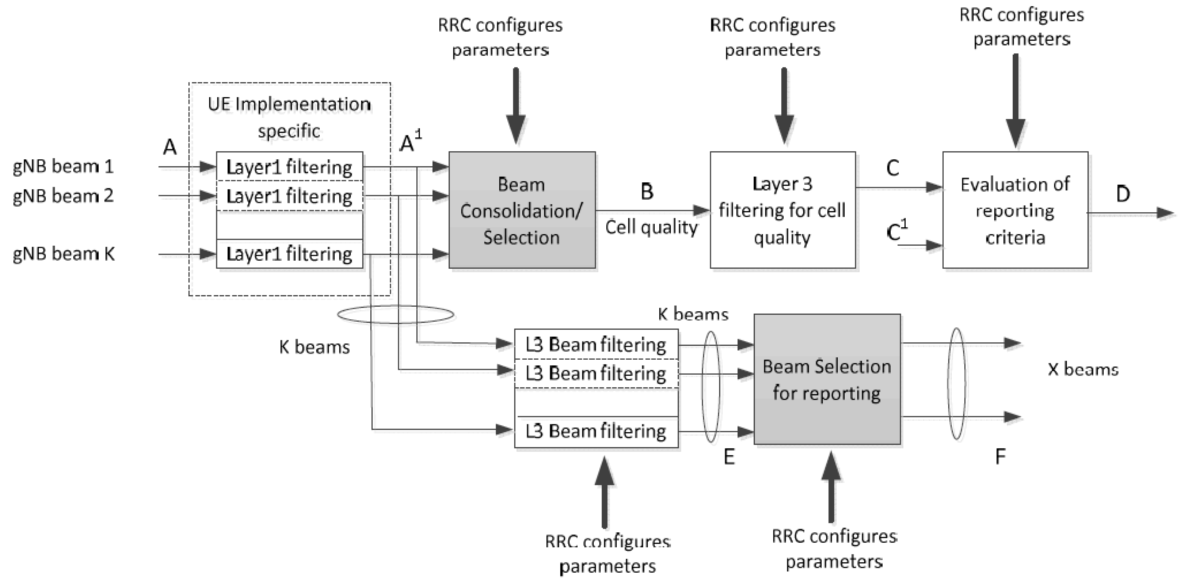
Claim 9	Public Documentation

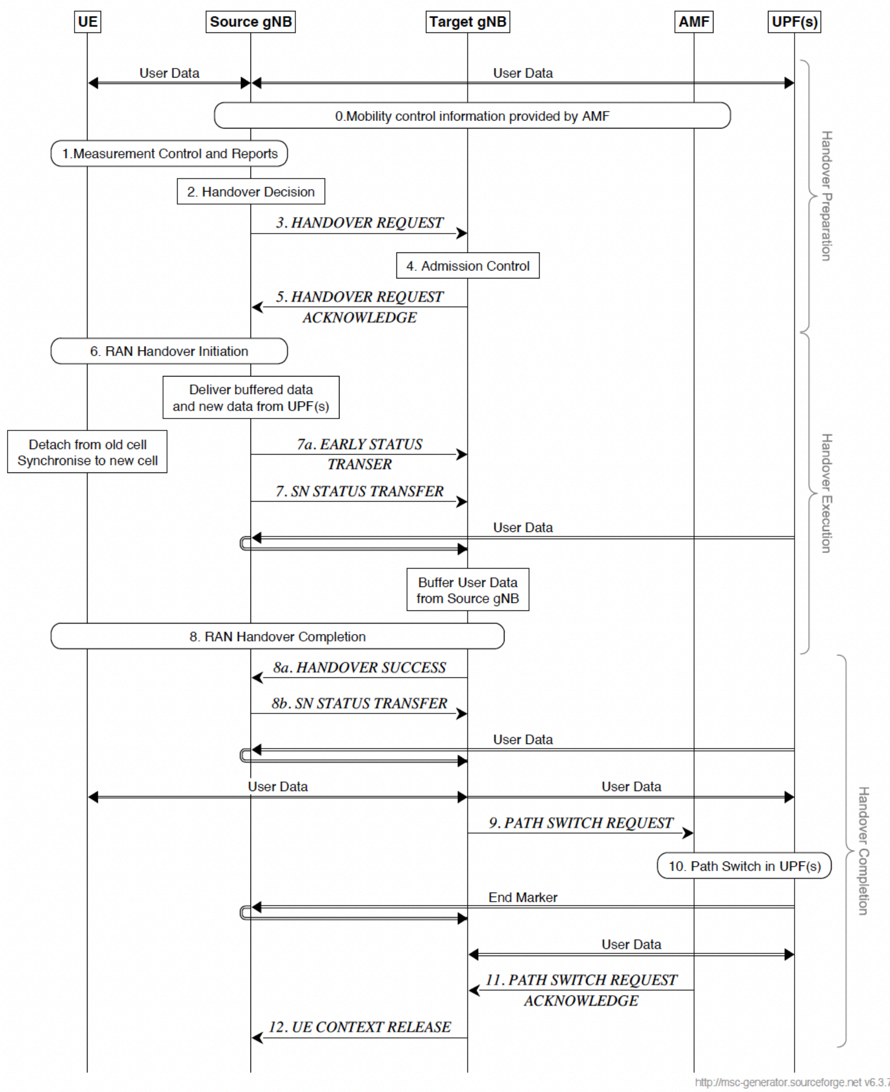
	As another example, in the Accused Instrumentalities a target gNodeB can receive a handoff request from a source ng-eNodeB, based in part on a determination that the wireless device is capable of being covered by the target gNodeB:
	9.3.1.2 Handover
	Inter RAT mobility is characterised by the following:
	- The Source RAT configures Target RAT measurement and reporting.
	- The source RAT decides on the preparation initiation and provides the necessary information to the target RAT in the format required by the target RAT:
	  - For handover preparation from E-UTRA to NR, the source RAT issues a handover preparation request message to the target RAT passing a transparent RRC container with necessary information to prepare the handover at the target side. The information for the target RAT is the same type as specified in clause 9.2.3.2.1 including the current QoS flow to DRB mapping applied to the UE and RRM configuration.
	  - The details of RRM configuration are the same type as specified for NR in clause 9.2.3.2.1 including beam measurement information for the listed cells if the measurements are available.
	- Radio resources are prepared in the target RAT before the handover.
	- The RRC reconfiguration message from the target RAT is delivered to the source RAT via a transparent container, and is passed to the UE by the source RAT in the handover command:
	  - The inter-RAT handover command message carries the same type of information required to access the target cell as specified for NR baseline handover in clause 9.2.3.2.1.
	- The in-sequence and lossless handover is supported for the handover between gNB and ng-eNB.
	(3GPP TS 38.300 v17.2.0, § 9.3.1.2)

[9b] based, at least in part, on the handoff request, adapting one or more beams of an antenna array to facilitate coverage of the wireless device by the first wireless network; and	The Accused Instrumentalities adapt, based at least in part on the handoff request, one or more beams of an antenna array to facilitate coverage of the wireless device by the first wireless network. For example, in the Accused Instrumentalities, a target gNodeB will have one or more antenna arrays, each providing multiple radio beams:

Claim 9	Public Documentation
	Antenna array structure The purpose of using a rectangular antenna array, as shown in section A of Figure 2, is to enable high-gain beams and make it possible to steer those beams over a range of angles. The gain is achieved, in both UL and DL, by constructively combining signals from a number of antenna elements. The more antenna elements there are, the higher the gain. Steerability is achieved by individually controlling the amplitude and phase of smaller parts of the antenna array. This is usually done by dividing the antenna array into so called sub-arrays (groups of non-overlapping elements), as shown in section C of Figure 2, and by applying two dedicated radio chains per sub-array (one per polarization) to enable control, as shown in section D. In this way it is possible to control the direction and other properties of the created antenna array beam.  Figure 2: A typical antenna array (A) is made up of rows and columns of individual dual-polarized antenna elements (B). Antenna arrays can be divided into sub-arrays (C), with each sub-array (D) connected to two radio chains, normally one per polarization. (https://www.ericsson.com/en/reports-and-papers/white-papers/advanced-antenna-systems-for-5g-networks)

Claim 9	Public Documentation
	As a further example, the target gNodeB will adapt one or more of the beams of an antenna array to facilitate coverage of the mobile wireless device: **Beam Level Mobility** does not require explicit RRC signalling to be triggered. Beam level mobility can be within a cell, or between cells, the latter is referred to as inter-cell beam management (ICBM). For ICBM, a UE can receive or transmit UE dedicated channels/signals via a TRP associated with a PCI different from the PCI of a serving cell, while non-UE-dedicated channels/signals can only be received via a TRP associated with a PCI of the serving cell. The gNB provides via RRC signalling the UE with measurement configuration containing configurations of SSB/CSI resources and resource sets, reports and trigger states for triggering channel and interference measurements and reports. In case of ICBM, a measurement configuration includes SSB resources associated with PCIs different from the PCI of a serving cell. Beam Level Mobility is then dealt with at lower layers by means of physical layer and MAC layer control signalling, and RRC is not required to know which beam is being used at a given point in time. SSB-based Beam Level Mobility is based on the SSB associated to the initial DL BWP and can only be configured for the initial DL BWPs and for DL BWPs containing the SSB associated to the initial DL BWP. For other DL BWPs, Beam Level Mobility can only be performed based on CSI-RS. (3GPP TS 38.300 v17.2.0, § 9.2.3.1) **9.2.4 Measurements** In RRC_CONNECTED, the UE measures multiple beams (at least one) of a cell and the measurements results (power values) are averaged to derive the cell quality. In doing so, the UE is configured to consider a subset of the detected beams. Filtering takes place at two different levels: at the physical layer to derive beam quality and then at RRC level to derive cell quality from multiple beams. Cell quality from beam measurements is derived in the same way for the serving cell(s) and for the non-serving cell(s). Measurement reports may contain the measurement results of the *X* best beams if the UE is configured to do so by the gNB. The corresponding high-level measurement model is described below:

Claim 9	Public Documentation
	 **Figure 9.2.4-1: Measurement Model** NOTE 1: K beams correspond to the measurements on SSB or CSI-RS resources configured for L3 mobility by gNB and detected by UE at L1. (3GPP TS 38.300 v17.2.0, § 9.2.4)
[9c] transmitting a confirmation from the first wireless network to the second wireless network to indicate acceptance of the handoff request, wherein the wireless device is handed off from the second wireless network to the first wireless network.	The Accused Instrumentalities transmit a confirmation from the first wireless network to the second wireless network to indicate acceptance of the handoff request, wherein the wireless device is handed off from the second wireless network to the first wireless network. For example, handoff in the Accused Instrumentalities involves steps shown in the following call flow diagram:

Claim 9	Public Documentation
	 **Figure 9.2.3.2.1-1: Intra-AMF/UPF Handover** (3GPP TS 38.300 v17.2.0, Figure 9.2.3.2.1-1.)

Claim 9	Public Documentation
	While the source node in this diagram is labeled "Source gNB," this source node may be a node with a 4G LTE radio interface, such as an ng-eNodeB. The target gNodeB transmits one or more confirmations, e.g., shown in the diagram above, to the source node, such as an ng-eNodeB. The wireless device is handed off from the source node wireless network to the target node wireless network: 12. Upon reception of the PATH SWITCH REQUEST ACKNOWLEDGE message from the AMF, the target gNB sends the UE CONTEXT RELEASE to inform the source gNB about the success of the handover. The source gNB can then release radio and C-plane related resources associated to the UE context. Any ongoing data forwarding may continue. (3GPP TS 38.300 v17.2.0, § 9.2.3.2.1)

Claim 10

Claim 10	Public Documentation
[10] A method according to claim 9, wherein the receiving the handoff request comprises receiving the handoff request via a wireless or a wired communication link that communicatively couples the first wireless network to the second wireless network.	In the Accused Instrumentalities, receiving the handoff request comprises receiving the handoff request via a wireless or a wired communication link that communicatively couples the first wireless network to the second wireless network. For example, the target gNodeB receives the handoff request over an Xn interface, which is a wireless or wired communications link that couples the first and second wireless networks:

<table>
<tr><th>Claim 10</th><th>Public Documentation</th></tr>
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9.2.3 Mobility in RRC_CONNECTED

9.2.3.1 Overview

Network controlled mobility applies to UEs in RRC_CONNECTED and is categorized into two types of mobility: cell level mobility and beam level mobility.

Cell Level Mobility requires explicit RRC signalling to be triggered, i.e. handover. For inter-gNB handover, the signalling procedures consist of at least the following elemental components illustrated in Figure 9.2.3.1-1:

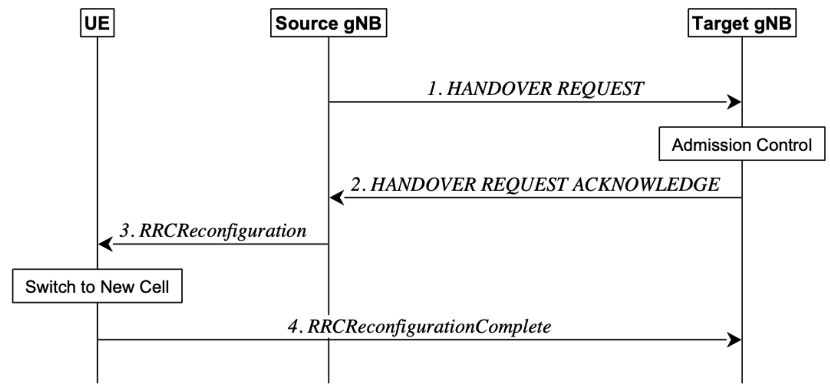

Figure 9.2.3.1-1: Inter-gNB handover procedures

1. The source gNB initiates handover and issues a Handover Request over the Xn interface.

(3GPP TS 38.300 v15.5.0, § 9.2.3)

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<tr><th>Claim 10</th><th>Public Documentation</th></tr>
<tr><td></td><td>

4 Overall Architecture and Functional Split

4.1 Overall Architecture

An NG-RAN node is either:

- a gNB, providing NR user plane and control plane protocol terminations towards the UE; or
- an ng-eNB, providing E-UTRA user plane and control plane protocol terminations towards the UE.

The gNBs and ng-eNBs are interconnected with each other by means of the Xn interface. The gNBs and ng-eNBs are also connected by means of the NG interfaces to the 5GC, more specifically to the AMF (Access and Mobility Management Function) by means of the NG-C interface and to the UPF (User Plane Function) by means of the NG-U interface (see TS 23.501 [3]).

NOTE: The architecture and the F1 interface for a functional split are defined in TS 38.401 [4].

The NG-RAN architecture is illustrated in Figure 4.1-1 below.

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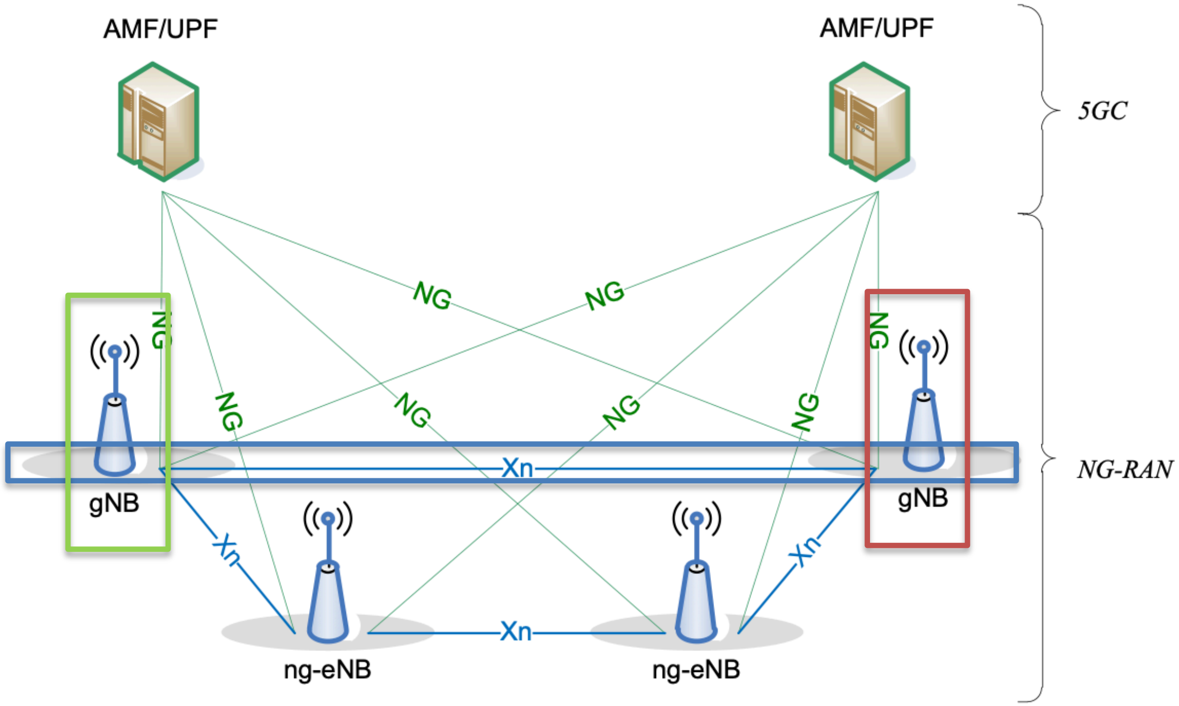
</table>

Claim 10	Public Documentation
	 **Figure 4.1-1: Overall Architecture** (3GPP TS 38.300 v15.5.0, Fig. 4.1-1)

Claim 12

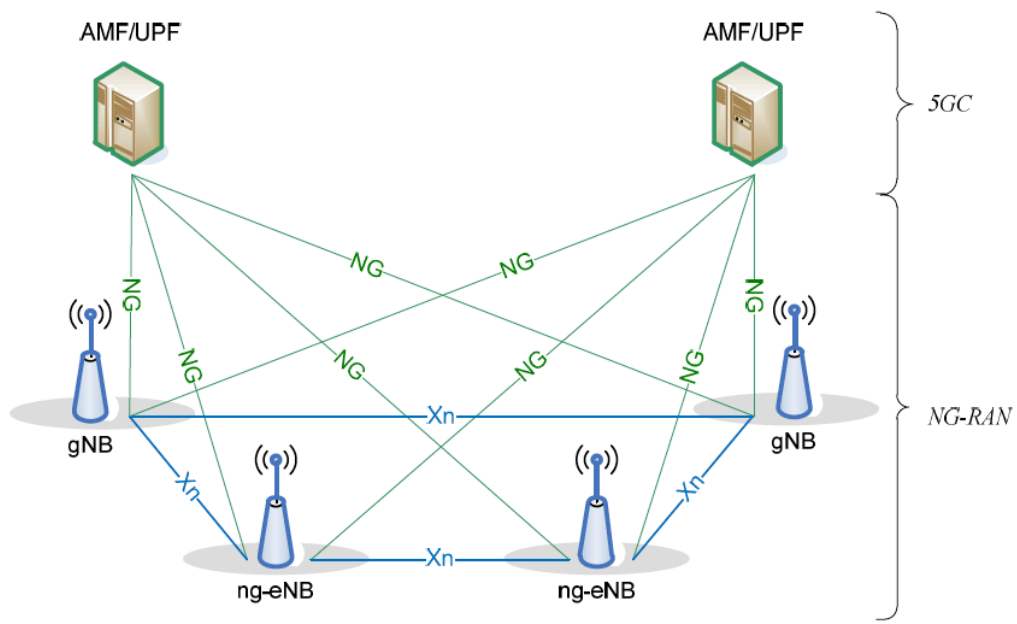
Claim 12	Public Documentation
[12] A method according to claim 9, wherein the adapting one or more beams comprises adapting one or more beams based, at least in part, on one of a predetermined network load placed on the first	In the Accused Instrumentalities, adapting one or more beams comprises adapting one or more beams based, at least in part, on one of a predetermined network load placed on the first wireless network due to the handoff of the wireless device or an effect of adapting one or more beams on other wireless devices currently communicatively coupled to the first wireless network.

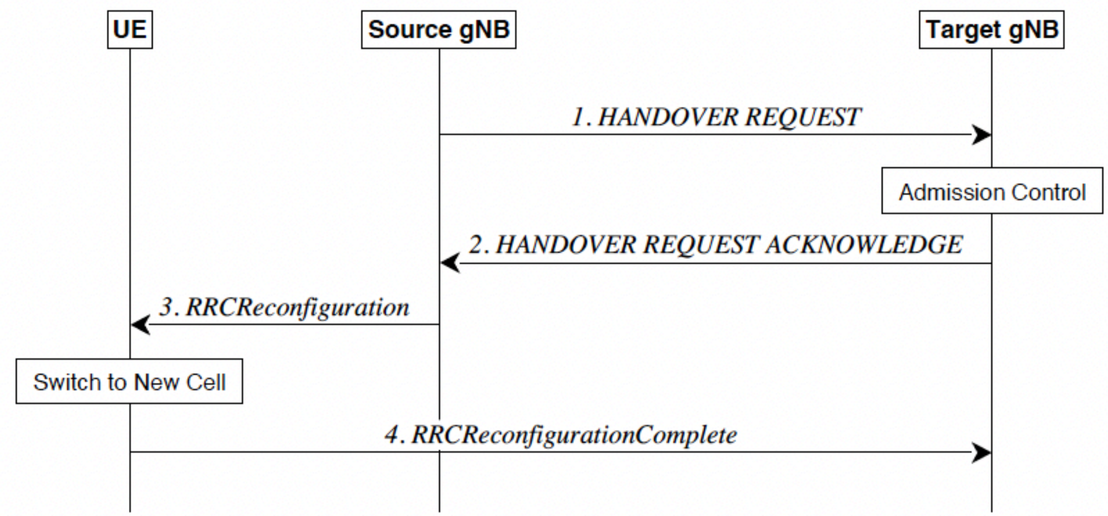
Claim 12	Public Documentation
wireless network due to the handoff of the wireless device or an effect of adapting one or more beams on other wireless devices currently communicatively coupled to the first wireless network.	For example, on information and belief the Accused Instrumentalities perform load balancing based upon load reporting and the effects of handoff and/or adapting beams on other wireless devices: **22.4 Self-optimisation** **22.4.1 Support for Mobility Load Balancing** **22.4.1.1 General** The objective of load balancing is to distribute cell load evenly among cells or to transfer part of the traffic from congested cells. This is done by the means of self-optimisation of mobility parameters or handover actions. Self-optimisation of the intra-LTE, inter-RAT and inter-system mobility parameters to the current load in the cell and in the adjacent cells can improve the system capacity compared to static/non-optimised cell reselection/handover parameters. Such optimisation can also minimize human intervention in the network management and optimisation tasks. Support for mobility load balancing consists of one or more of following functions: - Load reporting (for intra-LTE, inter-RAT, EN-DC and inter-system scenarios); - Load balancing action based on handovers; - Adapting handover and/or reselection configuration. Triggering of each of these functions is optional and depends on implementation. Functional architecture is presented in Figure 22.4.1.1-1. (3GPP TS 36.300 v17.3.0, § 22.4.1.1) **22.4.1.2 Load reporting** The load reporting function is executed by exchanging cell specific load information between neighbour eNBs over the X2 interface (intra-LTE scenario) or S1 (inter-RAT scenario and EN-DC scenario). The load reporting function for inter-system load balancing is executed by exchanging load information between E-UTRAN and NG-RAN. (3GPP TS 36.300 v17.3.0, § 22.4.1.2)

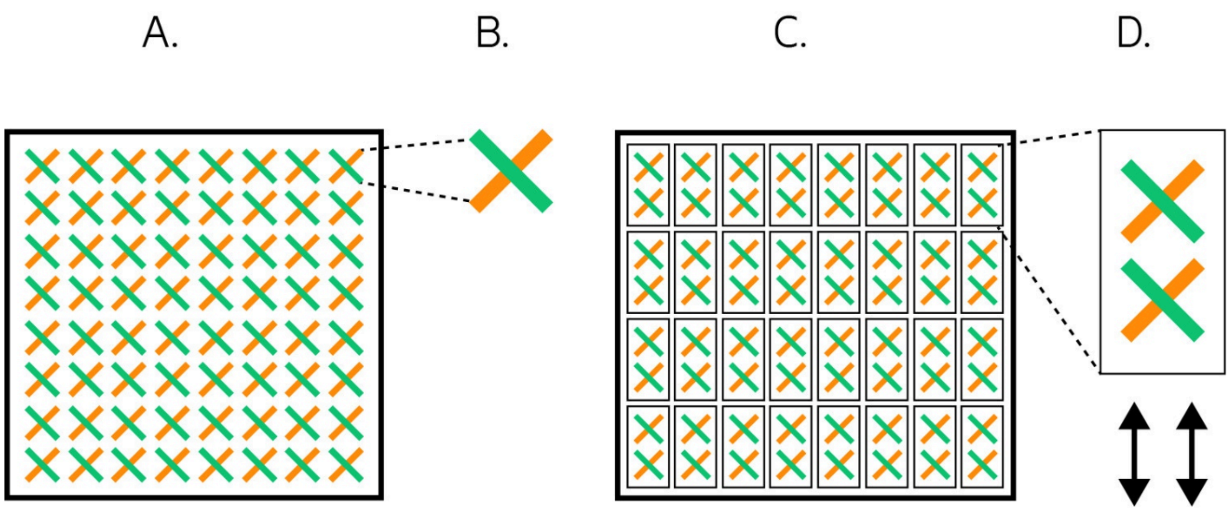
Claim 12	Public Documentation
	22.4.1.2.2 Load reporting for inter-RAT scenario The load information consists of: - Cell Capacity Class value (UL/DL relative capacity indicator: the same scale shall apply to E-UTRAN, UTRAN, GERAN and eHRPD cells when mapping cell capacities on this value); - Capacity value (UL/DL available capacity for load balancing as percentage of total cell capacity). NOTE 1: Capacity value is expressed in available E-UTRAN resources. NOTE 2: A cell is expected to accept traffic corresponding to the indicated available capacity. Event-triggered inter-RAT load reports are sent when the reporting node detects crossing of cell load thresholds. Load information shall be provided in a procedure separated from existing active mode mobility procedures, which shall be used infrequently and with lower priority with respect to the UE dedicated signalling. (3GPP TS 36.300 v17.3.0, § 22.4.1.2.2)

Claim 20

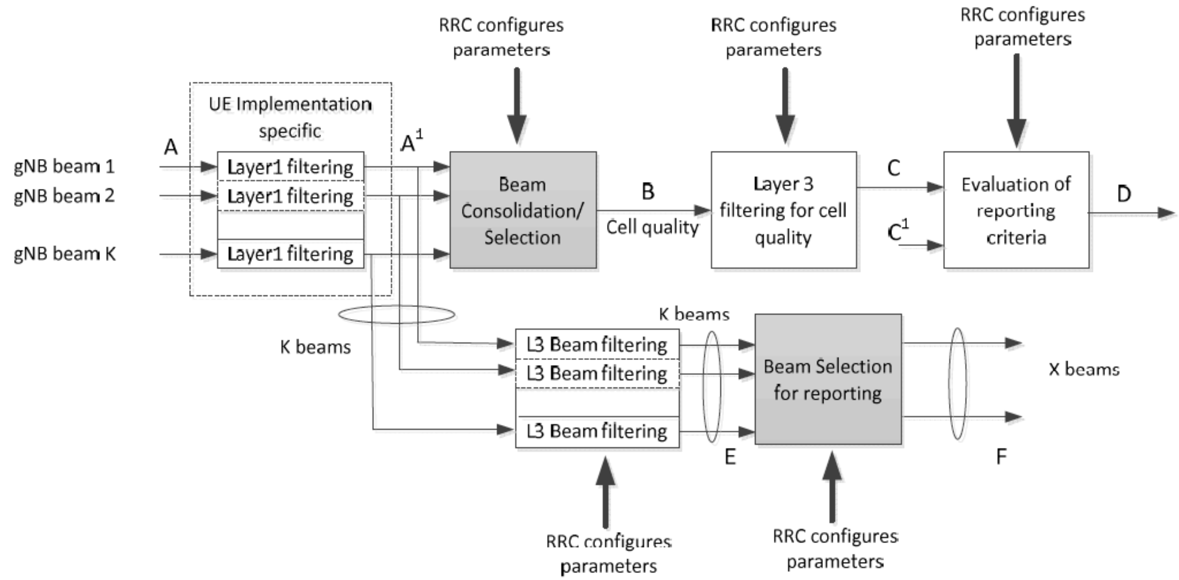
Claim 20	Public Documentation
[20pre] A system for a wireless device handoff between a first wireless network and a second wireless network, the system comprising:	To the extent the preamble is found to be limiting, the Accused Instrumentalities comprise a system for a wireless device handoff between a first wireless network and a second wireless network. For example, the Accused Instrumentalities contain a system for handoff of a mobile wireless device between a first wireless network, comprising for example a 5G NR gNodeB base station, and a second wireless network, comprising for example a 4G LTE eNodeB or ng-eNodeB base station. This method is described, for example, in 3GPP standards documents such as TS 38.300, which describe aspects of the operations of the eNodeB/ng-eNodeB and gNodeB and associated components of the Accused Instrumentalities.

Claim 20	Public Documentation
	4.1 Overall Architecture An NG-RAN node is either: - a gNB, providing NR user plane and control plane protocol terminations towards the UE; or - an ng-eNB, providing E-UTRA user plane and control plane protocol terminations towards the UE. The gNBs and ng-eNBs are interconnected with each other by means of the Xn interface. The gNBs and ng-eNBs are also connected by means of the NG interfaces to the 5GC, more specifically to the AMF (Access and Mobility Management Function) by means of the NG-C interface and to the UPF (User Plane Function) by means of the NG-U interface (see TS 23.501 [3]). NOTE: The architecture and the F1 interface for a functional split are defined in TS 38.401 [4]. The NG-RAN architecture is illustrated in Figure 4.1-1 below.  **Figure 4.1-1: Overall Architecture**

Claim 20	Public Documentation
	(3GPP TS 38.300 v17.2.0, § 4.1) The method includes a handover request and an acknowledgement, as illustrated for example in the following figure:  **Figure 9.2.3.1-1: Inter-gNB handover procedures** (3GPP TS 38.300 v17.2.0, Figure 9.2.3.1-1.) In this figure, the source node is a gNodeB, but a similar request and acknowledgement will be used when the source node is an eNodeB or ng-eNodeB.
[20a] an antenna array configured to generate one or more adaptable beams to modify a coverage area for the first wireless network; and	The Accused Instrumentalities comprise an antenna array configured to generate one or more adaptable beams to modify a coverage area for the first wireless network. For example, in the Accused Instrumentalities, a target gNodeB will have one or more antenna arrays, each providing multiple radio beams:

Claim 20	Public Documentation
	Antenna array structure The purpose of using a rectangular antenna array, as shown in section A of Figure 2, is to enable high-gain beams and make it possible to steer those beams over a range of angles. The gain is achieved, in both UL and DL, by constructively combining signals from a number of antenna elements. The more antenna elements there are, the higher the gain. Steerability is achieved by individually controlling the amplitude and phase of smaller parts of the antenna array. This is usually done by dividing the antenna array into so called sub-arrays (groups of non-overlapping elements), as shown in section C of Figure 2, and by applying two dedicated radio chains per sub-array (one per polarization) to enable control, as shown in section D. In this way it is possible to control the direction and other properties of the created antenna array beam.  Figure 2: A typical antenna array (A) is made up of rows and columns of individual dual-polarized antenna elements (B). Antenna arrays can be divided into sub-arrays (C), with each sub-array (D) connected to two radio chains, normally one per polarization. (https://www.ericsson.com/en/reports-and-papers/white-papers/advanced-antenna-systems-for-5g-networks)

Claim 20	Public Documentation
	As a further example, the target gNodeB will adapt one or more of the beams of an antenna array to facilitate coverage of the mobile wireless device: **Beam Level Mobility** does not require explicit RRC signalling to be triggered. Beam level mobility can be within a cell, or between cells, the latter is referred to as inter-cell beam management (ICBM). For ICBM, a UE can receive or transmit UE dedicated channels/signals via a TRP associated with a PCI different from the PCI of a serving cell, while non-UE-dedicated channels/signals can only be received via a TRP associated with a PCI of the serving cell. The gNB provides via RRC signalling the UE with measurement configuration containing configurations of SSB/CSI resources and resource sets, reports and trigger states for triggering channel and interference measurements and reports. In case of ICBM, a measurement configuration includes SSB resources associated with PCIs different from the PCI of a serving cell. Beam Level Mobility is then dealt with at lower layers by means of physical layer and MAC layer control signalling, and RRC is not required to know which beam is being used at a given point in time. SSB-based Beam Level Mobility is based on the SSB associated to the initial DL BWP and can only be configured for the initial DL BWPs and for DL BWPs containing the SSB associated to the initial DL BWP. For other DL BWPs, Beam Level Mobility can only be performed based on CSI-RS. (3GPP TS 38.300 v17.2.0, § 9.2.3.1) **9.2.4 Measurements** In RRC_CONNECTED, the UE measures multiple beams (at least one) of a cell and the measurements results (power values) are averaged to derive the cell quality. In doing so, the UE is configured to consider a subset of the detected beams. Filtering takes place at two different levels: at the physical layer to derive beam quality and then at RRC level to derive cell quality from multiple beams. Cell quality from beam measurements is derived in the same way for the serving cell(s) and for the non-serving cell(s). Measurement reports may contain the measurement results of the *X* best beams if the UE is configured to do so by the gNB. The corresponding high-level measurement model is described below:

Claim 20	Public Documentation
	 **Figure 9.2.4-1: Measurement Model** NOTE 1: K beams correspond to the measurements on SSB or CSI-RS resources configured for L3 mobility by gNB and detected by UE at L1. (3GPP TS 38.300 v17.2.0, § 9.2.4)
[20b] an adaption manager having logic, the logic configured to: receive a handoff request from the second wireless network, the handoff request based, at least in part, on a determination by the second wireless network that the wireless device is capable of being covered by the first wireless network,	The Accused Instrumentalities comprise an adaption manager having logic configured to receive a handoff request from the second wireless network, the handoff request based, at least in part, on a determination by the second wireless network that the wireless device is capable of being covered by the first wireless network. For example, in the Accused Instrumentalities a target NG-RAN node (such as a gNodeB) containing an adaption manager can receive a handoff request from a source eNodeB, based in part on a determination that the wireless device is capable of being covered by the target gNodeB:

Claim 20	Public Documentation

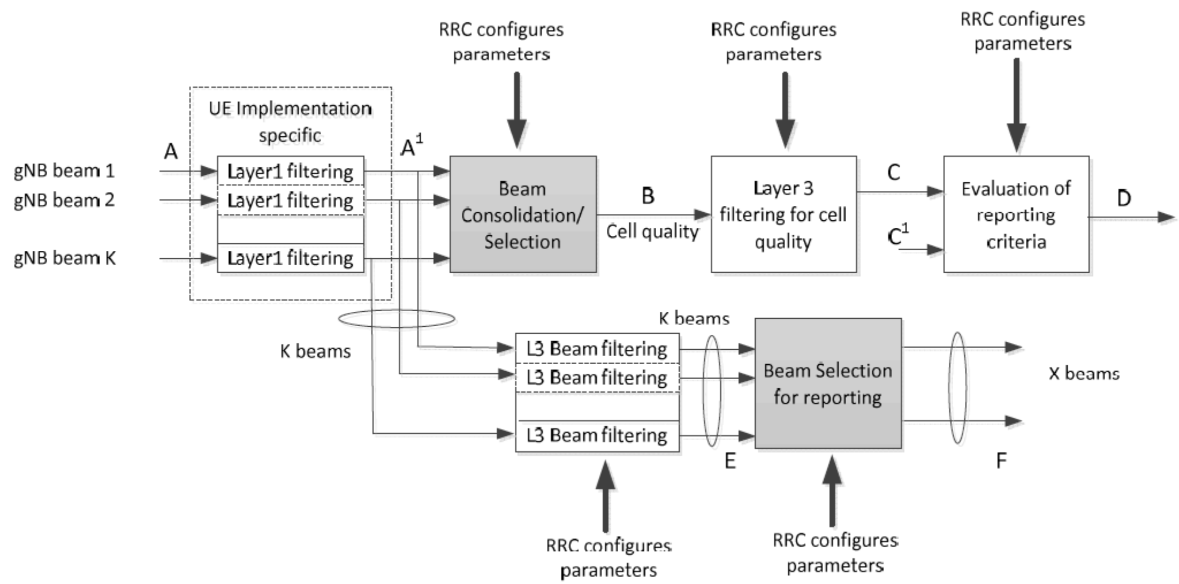
	9.3.3 NR-E-UTRA mobility: From EPC to 5GC
	
	9.3.3.1 Data Forwarding for the Control Plane
	
	Control plane handling for inter-System data forwarding from EPS to 5GS follows the following key principles:
	
	- Only forwarding of downlink data is supported.
	- The target NG-RAN node receives in the Handover Request message the mapping between E-RAB ID(s) and QoS Flow ID(s). It decides whether to accept the data forwarding for E-RAB IDs proposed for forwarding within the Source NG-RAN Node to Target NG-RAN Node Transparent Container. Based on availability of direct data forwarding path the source eNB may request to apply direct data forwarding by indicating direct data forwarding availability to the CN.
	- In case of indirect data forwarding:
	  - The target NG-RAN node assigns a TEID/TNL address for each PDU session for which at least one QoS flow is involved in the accepted data forwarding.
	  - The target NG-RAN node sends the Handover Request Acknowledge message in which it indicates the list of PDU sessions and QoS flows for which it has accepted the data forwarding.
	  - A single data forwarding tunnel is established between the UPF and the target NG-RAN node per PDU session for which at least data for a single QoS Flow is subject to data forwarding.
	  - The source eNB receives in the Handover Command message the list of E-RAB IDs for which the target NG-RAN node has accepted data forwarding of corresponding PDU sessions and QoS flows.
	- In case of direct data forwarding:
	  - The source eNB indicates direct path availability to the CN. The source eNB's decision is indicated by the CN to the target NG-RAN node.
	  - The target NG-RAN node assigns a TEID/TNL address for each E-RAB it accepted for data forwarding.
	  - The source eNB receives in the Handover Command message the list of E-RAB IDs for which the target NG-RAN node has accepted data forwarding.
	
	(3GPP TS 38.300 v17.2.0, § 9.3.3.1)

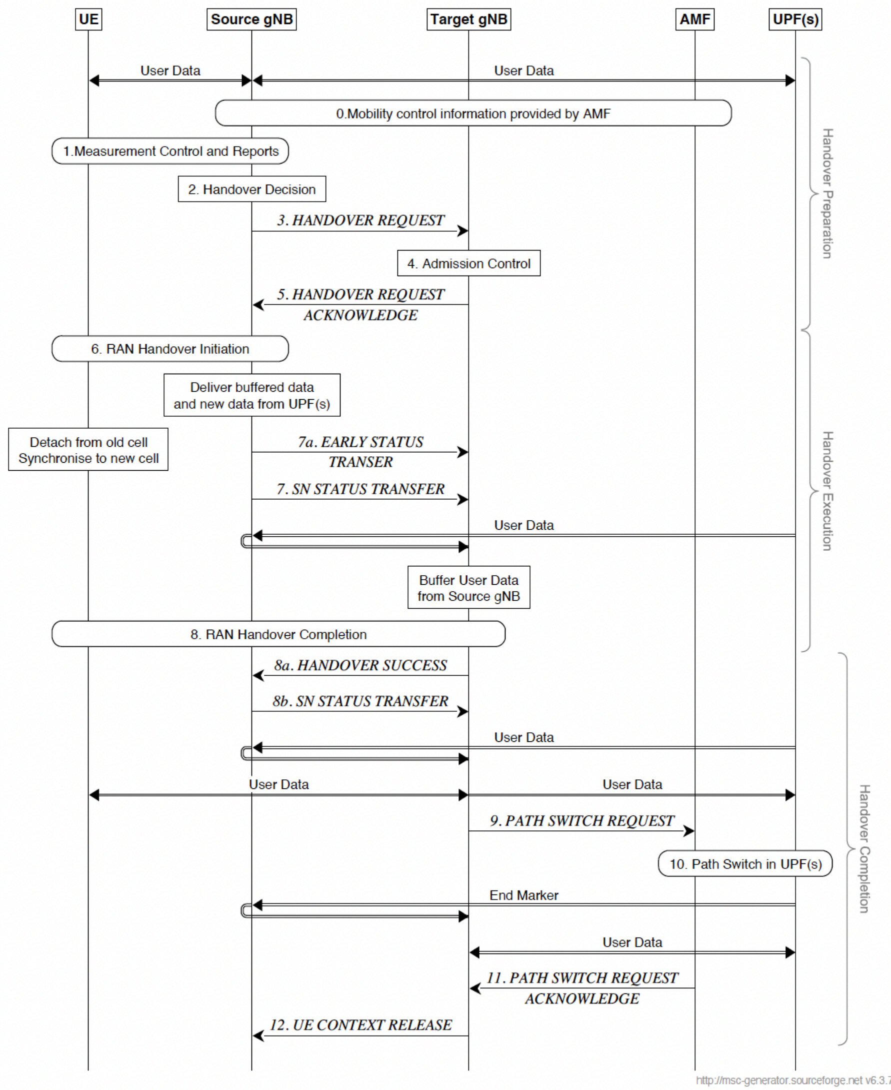
Claim 20	Public Documentation

	As another example, in the Accused Instrumentalities a target gNodeB can receive a handoff request from a source ng-eNodeB, based in part on a determination that the wireless device is capable of being covered by the target gNodeB:
	9.3.1.2 Handover
	Inter RAT mobility is characterised by the following:
	- The Source RAT configures Target RAT measurement and reporting.
	- The source RAT decides on the preparation initiation and provides the necessary information to the target RAT in the format required by the target RAT:
	  - For handover preparation from E-UTRA to NR, the source RAT issues a handover preparation request message to the target RAT passing a transparent RRC container with necessary information to prepare the handover at the target side. The information for the target RAT is the same type as specified in clause 9.2.3.2.1 including the current QoS flow to DRB mapping applied to the UE and RRM configuration.
	  - The details of RRM configuration are the same type as specified for NR in clause 9.2.3.2.1 including beam measurement information for the listed cells if the measurements are available.
	- Radio resources are prepared in the target RAT before the handover.
	- The RRC reconfiguration message from the target RAT is delivered to the source RAT via a transparent container, and is passed to the UE by the source RAT in the handover command:
	  - The inter-RAT handover command message carries the same type of information required to access the target cell as specified for NR baseline handover in clause 9.2.3.2.1.
	- The in-sequence and lossless handover is supported for the handover between gNB and ng-eNB.
	(3GPP TS 38.300 v17.2.0, § 9.3.1.2)

[20c] cause a beam from among the one or more adaptable beams to be adapted in order to enable the wireless device to be covered by the first wireless network, and	In the Accused Instrumentalities the logic causes a beam from among the one or more adaptable beams to be adapted in order to enable the wireless device to be covered by the first wireless network. As a further example, the target gNodeB will adapt one or more of the beams of an antenna array to facilitate coverage of the mobile wireless device:

Claim 20	Public Documentation
	Beam Level Mobility does not require explicit RRC signalling to be triggered. Beam level mobility can be within a cell, or between cells, the latter is referred to as inter-cell beam management (ICBM). For ICBM, a UE can receive or transmit UE dedicated channels/signals via a TRP associated with a PCI different from the PCI of a serving cell, while non-UE-dedicated channels/signals can only be received via a TRP associated with a PCI of the serving cell. The gNB provides via RRC signalling the UE with measurement configuration containing configurations of SSB/CSI resources and resource sets, reports and trigger states for triggering channel and interference measurements and reports. In case of ICBM, a measurement configuration includes SSB resources associated with PCIs different from the PCI of a serving cell. Beam Level Mobility is then dealt with at lower layers by means of physical layer and MAC layer control signalling, and RRC is not required to know which beam is being used at a given point in time. SSB-based Beam Level Mobility is based on the SSB associated to the initial DL BWP and can only be configured for the initial DL BWPs and for DL BWPs containing the SSB associated to the initial DL BWP. For other DL BWPs, Beam Level Mobility can only be performed based on CSI-RS. (3GPP TS 38.300 v17.2.0, § 9.2.3.1) **9.2.4 Measurements** In RRC_CONNECTED, the UE measures multiple beams (at least one) of a cell and the measurements results (power values) are averaged to derive the cell quality. In doing so, the UE is configured to consider a subset of the detected beams. Filtering takes place at two different levels: at the physical layer to derive beam quality and then at RRC level to derive cell quality from multiple beams. Cell quality from beam measurements is derived in the same way for the serving cell(s) and for the non-serving cell(s). Measurement reports may contain the measurement results of the *X* best beams if the UE is configured to do so by the gNB. The corresponding high-level measurement model is described below:

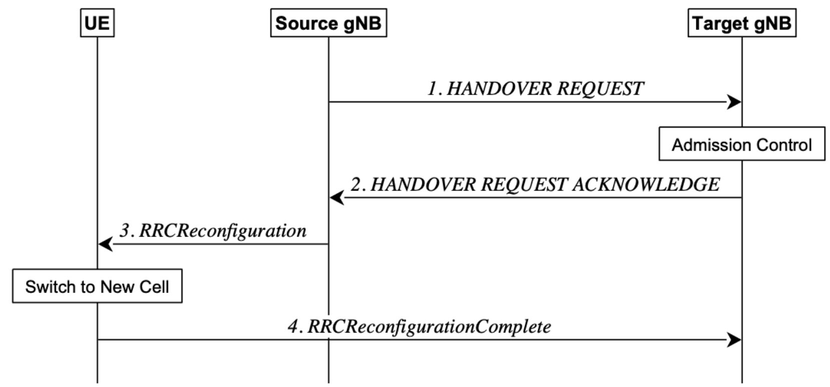
Claim 20	Public Documentation
	 **Figure 9.2.4-1: Measurement Model** NOTE 1: K beams correspond to the measurements on SSB or CSI-RS resources configured for L3 mobility by gNB and detected by UE at L1. (3GPP TS 38.300 v17.2.0, § 9.2.4)
[20d] transmit a confirmation to the second wireless network to indicate acceptance of the handoff request, wherein the wireless device is handed off from the second wireless network to the first wireless network.	In the Accused Instrumentalities the logic transmits a confirmation to the second wireless network to indicate acceptance of the handoff request, wherein the wireless device is handed off from the second wireless network to the first wireless network For example, handoff in the Accused Instrumentalities involves steps shown in the following call flow diagram:

Claim 20	Public Documentation
	 **Figure 9.2.3.2.1-1: Intra-AMF/UPF Handover** (3GPP TS 38.300 v17.2.0, Figure 9.2.3.2.1-1.)

Claim 20	Public Documentation
	While the source node in this diagram is labeled "Source gNB," this source node may be a node with a 4G LTE radio interface, such as an ng-eNodeB. The target gNodeB transmits one or more confirmations, e.g., shown in the diagram above, to the source node, such as an ng-eNodeB. The wireless device is handed off from the source node wireless network to the target node wireless network: 12. Upon reception of the PATH SWITCH REQUEST ACKNOWLEDGE message from the AMF, the target gNB sends the UE CONTEXT RELEASE to inform the source gNB about the success of the handover. The source gNB can then release radio and C-plane related resources associated to the UE context. Any ongoing data forwarding may continue. (3GPP TS 38.300 v17.2.0, § 9.2.3.2.1)

Claim 21

Claim 21	Public Documentation
[21] A system according to claim 20, wherein to receive the handoff request comprises to receive the handoff request via a wireless or a wired communication link that communicatively couples the first wireless network to the second wireless network.	In the Accused Instrumentalities, receiving the handoff request comprises to receive the handoff request via a wireless or a wired communication link that communicatively couples the first wireless network to the second wireless network. For example, the target gNodeB receives the handoff request over an Xn interface, which is a wireless or wired communications link that couples the first and second wireless networks:

Claim 21	Public Documentation
	## 9.2.3 Mobility in RRC_CONNECTED ### 9.2.3.1 Overview Network controlled mobility applies to UEs in RRC_CONNECTED and is categorized into two types of mobility: cell level mobility and beam level mobility. **Cell Level Mobility** requires explicit RRC signalling to be triggered, i.e. handover. For inter-gNB handover, the signalling procedures consist of at least the following elemental components illustrated in Figure 9.2.3.1-1:  **Figure 9.2.3.1-1: Inter-gNB handover procedures** 1. The source gNB initiates handover and issues a Handover Request over the Xn interface. (3GPP TS 38.300 v15.5.0, § 9.2.3)

Claim 21	Public Documentation
	4 Overall Architecture and Functional Split **4.1 Overall Architecture** An NG-RAN node is either: - a gNB, providing NR user plane and control plane protocol terminations towards the UE; or - an ng-eNB, providing E-UTRA user plane and control plane protocol terminations towards the UE. The gNBs and ng-eNBs are interconnected with each other by means of the Xn interface. The gNBs and ng-eNBs are also connected by means of the NG interfaces to the 5GC, more specifically to the AMF (Access and Mobility Management Function) by means of the NG-C interface and to the UPF (User Plane Function) by means of the NG-U interface (see TS 23.501 [3]). NOTE: The architecture and the F1 interface for a functional split are defined in TS 38.401 [4]. The NG-RAN architecture is illustrated in Figure 4.1-1 below.

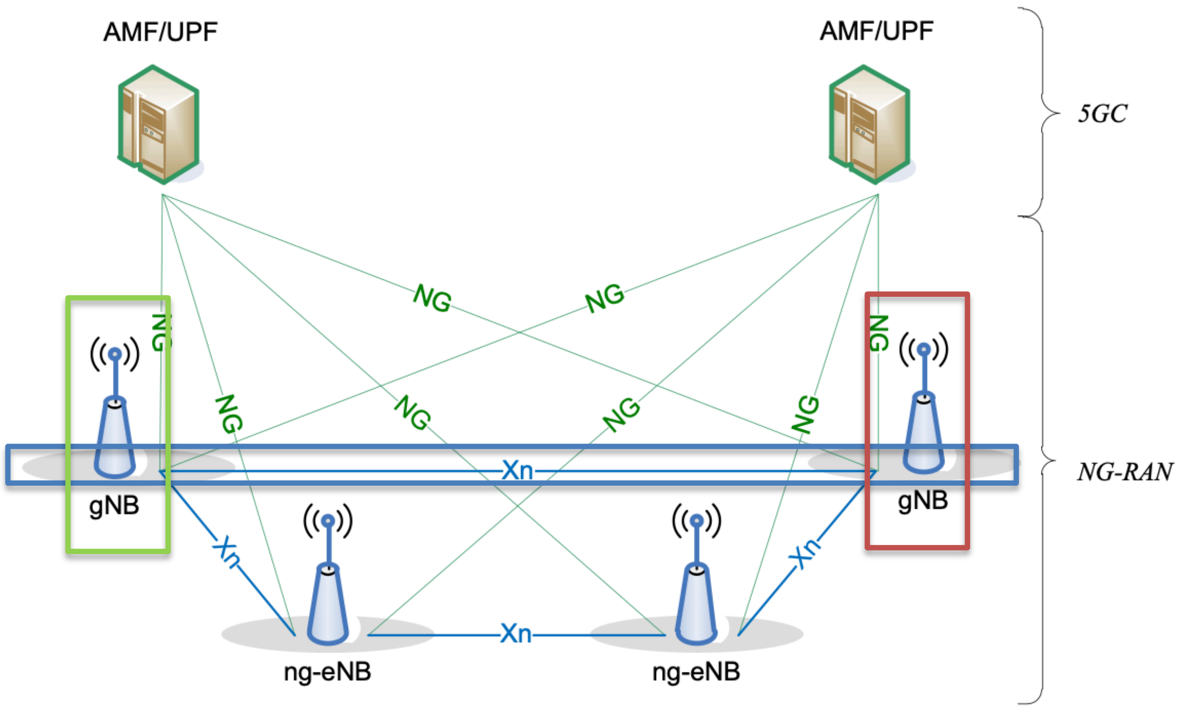
<table>
<tr><th>Claim 21</th><th>Public Documentation</th></tr>
<tr><td></td><td>

Figure 4.1-1: Overall Architecture

(3GPP TS 38.300 v15.5.0, Fig. 4.1-1)</td></tr>
</table>

Claim 23

Claim 23	Public Documentation
[23] A system according to claim 20, wherein to cause the beam to be adapted comprises to cause a beam to be adapted based, at least in part, on one of a network load placed on the first wireless network	In the Accused Instrumentalities, causing the beam to be adapted comprises to cause a beam to be adapted based, at least in part, on one of a network load placed on the first wireless network due to the handoff of the wireless device or an impact of adapting one or more beams on other wireless devices currently communicatively coupled to the first wireless network.

<table>
<tr><th>Claim 23</th><th>Public Documentation</th></tr>
<tr><td>due to the handoff of the wireless device or an impact of adapting one or more beams on other wireless devices currently communicatively coupled to the first wireless network.</td><td>For example, on information and belief the Accused Instrumentalities perform load balancing based upon load reporting and the effects of handoff and/or adapting beams on other wireless devices:

22.4 Self-optimisation

22.4.1 Support for Mobility Load Balancing

22.4.1.1 General

The objective of load balancing is to distribute cell load evenly among cells or to transfer part of the traffic from congested cells. This is done by the means of self-optimisation of mobility parameters or handover actions.

Self-optimisation of the intra-LTE, inter-RAT and inter-system mobility parameters to the current load in the cell and in the adjacent cells can improve the system capacity compared to static/non-optimised cell reselection/handover parameters. Such optimisation can also minimize human intervention in the network management and optimisation tasks.

Support for mobility load balancing consists of one or more of following functions:
- Load reporting (for intra-LTE, inter-RAT, EN-DC and inter-system scenarios);
- Load balancing action based on handovers;
- Adapting handover and/or reselection configuration.

Triggering of each of these functions is optional and depends on implementation. Functional architecture is presented in Figure 22.4.1.1-1.

(3GPP TS 36.300 v17.3.0, § 22.4.1.1)

22.4.1.2 Load reporting

The load reporting function is executed by exchanging cell specific load information between neighbour eNBs over the X2 interface (intra-LTE scenario) or S1 (inter-RAT scenario and EN-DC scenario). The load reporting function for inter-system load balancing is executed by exchanging load information between E-UTRAN and NG-RAN.

(3GPP TS 36.300 v17.3.0, § 22.4.1.2)</td></tr>
</table>

Claim 23	Public Documentation
	22.4.1.2.2 Load reporting for inter-RAT scenario The load information consists of: - Cell Capacity Class value (UL/DL relative capacity indicator: the same scale shall apply to E-UTRAN, UTRAN, GERAN and eHRPD cells when mapping cell capacities on this value); - Capacity value (UL/DL available capacity for load balancing as percentage of total cell capacity). NOTE 1: Capacity value is expressed in available E-UTRAN resources. NOTE 2: A cell is expected to accept traffic corresponding to the indicated available capacity. Event-triggered inter-RAT load reports are sent when the reporting node detects crossing of cell load thresholds. Load information shall be provided in a procedure separated from existing active mode mobility procedures, which shall be used infrequently and with lower priority with respect to the UE dedicated signalling. (3GPP TS 36.300 v17.3.0, § 22.4.1.2.2)